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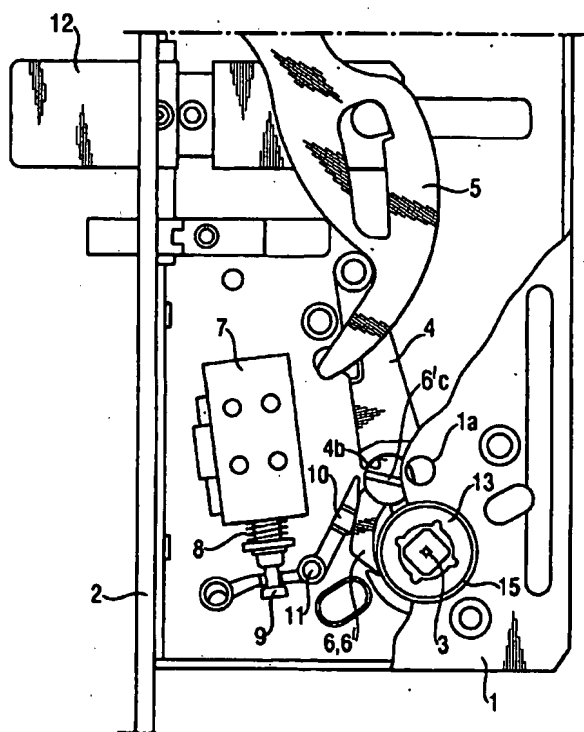
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(54) Title: **INSTALLATION ARRANGEMENT FOR CONTROLLING HANDLE OPERATION IN A DOOR LOCK AND A DOOR LOCK PROVIDED WITH AN INSTALLATION ARRANGEMENT OF THIS KIND**



(57) Abstract: An installation arrangement for a solenoid controlled handle operation in a door lock in which force transmission from an operation axis (3) for a handle or the like to a follower (4) acting on a bolt (12) of the lock is arranged by means of a movable coupling member (6,6'), which receives its guidance from a solenoid arrangement. The follower (4) is provided with two separate torsion units (13,14) which are installed on the operation axis (3) on different sides of the follower (4) and are turnably supported to it and which can be selectively coupled by means of said coupling member (6,6') to be in force transmission connection with the follower (4).

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**INSTALLATION ARRANGEMENT FOR CONTROLLING HANDLE OPERATION  
IN A DOOR LOCK AND A DOOR LOCK PROVIDED WITH AN INSTALLATION  
5 ARRANGEMENT OF THIS KIND**

The invention relates to an installation arrangement for a solenoid controlled handle operation in a door lock in which force transmission from either side of the lock from an operation axis for a handle or the like to a follower acting  
10 on a bolt of the lock is arranged by means of a movable coupling member, which receives its guidance from a solenoid arrangement in accordance with the preamble of claim 1, and to a door lock in which the arrangement in question is made use of in accordance with the preamble of claim 10.

15 Control of a handle operation in a door lock by means of a solenoid arrangement can be accomplished in different ways depending on the application. The arrangement may for instance be such that when the solenoid is energized it allows or makes it possible the right to passage by using a handle, whereby, thus, force transmission from the handle to the bolt of the lock is  
20 coupled. Alternatively the solution may be reversed so that the arrangement allows the right to passage by using a handle when the solenoid is de-energized. The way of operation of the arrangement depends on whether stress is laid on the security of the right to passage or getting out of the locked space or on the security of the locked space as such.

25 In practice the arrangement is usually such that from outside the door can always be opened by means of a key operated lock mechanism of the like and from inside by means of a handle, a turning knob or the like, whereby selective coupling of the handle operation presumes at the same time a two-  
30 piece or divided shaft of operation. Depending on the location of application the arrangement can also be for instance such that the door is provided with a handle or the like on both sides whereby from one side the door can always

be opened by means of a handle and from the other side only selectively depending on the situation.

Another patent application discloses a solution to a problem how the same basic parts to be installed in a lock case can be made use of for both the ways of operation so that the selection of the way of operation of a handle can be accomplished in a simple way from outside the lock case without the need to open the lock case. An installation of a door lock of this kind, however, involves also another essential selection to be made depending thereon, on which side of the door and thus the lock case of the door lock there is a need to provide a handle operation. Also in this connection there is a desire to avoid providing two separate lock cases for doors turnable in different directions.

An aim of the invention is to solve the problem presented above and to provide such an installation arrangement, by means of which a lock case may be modified in connection with installation to a door so that it can be utilized in the door independent on the intended direction of turning for opening the door. A further aim is to provide an installation arrangement by means of which the measures of modification to be made in the lock case, if needed, can be accomplished without opening the lock case in as simple and easy way as possible.

The aims of the invention can be met as is more closely disclosed in claim 1 and in the other claims. According to the invention the follower is provided with two separate torsion units which are installed on the operation axis on different sides of the follower and are turnably supported to it and which can be coupled by means of said coupling member to be in force transmission connection with the follower.

The arrangement according to the invention includes with advantage an adapting member which is arranged to be installed in a spindle aperture of

either one of the torsion units to thereby prevent a spindle of the handle from directly connecting with the follower, so that the spindle of the handle is in force transmission connection with the torsion unit in question. Hereby handles with a spindle of normal length can be utilized in all cases.

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In a favourable embodiment of the invention the coupling member includes two protrusions which each can be coupled to be in cooperation with a torsion unit of its own. In this case the coupling member can be moved normally under the control of the solenoid but there is no need to displace the coupling member for changing the handle operation from one side of the door to the other.

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In another embodiment of the invention the coupling member includes a protrusion which has a first installation position in which it is in cooperation with a first torsion unit and a second installation position in which it is in cooperation with a second torsion unit, whereby the coupling member is movable from the first installation position to the second installation position for changing the handle operation from one side of the door lock to the other.

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The coupling member is with advantage turnably journaled to the follower and arranged to be movable in the direction of the operation axis for affecting said changing of the handle operation. For this purpose the follower advantageously includes a sleeve-like member for journalling of the coupling member. In addition the follower may include a guiding member, for instance a protrusion, which normally prevents movement of the coupling member from its first installation position to its second installation position. Hereby inadvertent movement of the coupling member can easily be prevented.

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In addition the coupling member includes with advantage counter surfaces for an installation tool. If the lock case of the door lock includes then an opening through which the installation tool can be taken to be in cooperation with said counter surfaces for said moving of the coupling member, said

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measure of installation can easily be made when needed without opening of the lock case.

5 A second aspect of the invention relates to a door lock, to which an installation arrangement described above is advantageously adapted and which includes a bolt, a follower for moving the bolt and an operation axis at either end of which an operation device can be installed for operation of the follower, whereby force transmission from either side of the lock to the follower is arranged by means of a movable coupling member, which receives its  
10 guidance from a solenoid arrangement or the like. The follower is provided with two separate torsion units which are installed on the operation axis on different sides of the follower and are turnably supported to it and which can be coupled by means of said coupling member to be in force transmission connection with the follower. On said operation axis on one side of the lock  
15 and the follower there is arranged to installed an operation device, for instance a key operated lock mechanism, a handle or the like, which acts directly on the follower through a spindle aperture located therein. On said operation axis on the other side of the lock and the follower there is arranged to be installed an operation device, for instance a handle or the like, which is  
20 arranged in force transmission connection with the follower through the torsion unit and said coupling member.

The selection for providing force transmission through the torsion unit is arranged by making use of a separate adapting member, which is installed in  
25 the spindle aperture of the selected torsion unit so that it prevents a spindle of the handle from directly connecting with the follower.

In case the coupling member includes a protrusion which is functionally connected with only one torsion unit at a time, the selection for providing force  
30 transmission through the torsion unit is arranged by arranging the said protrusion of the coupling member on the desired side of the follower.

In the following the invention is described, by way of example only, with reference to the attached drawings, in which

- Fig. 1 shows as a view of principle a door lock according to the invention, viewed from a side, the lock case partly opened and provided with an installation arrangement according to the invention,
- Fig. 2 shows as an exploded view an embodiment of a follower arrangement included in the installation arrangement according to the invention,
- Figs. 3a and 3b illustrate by means of the follower arrangement of Fig. 2 installation measures relating to the installation arrangement according to the invention,
- Fig. 4 shows as an exploded view another embodiment of a follower arrangement included in the installation arrangement according to the invention,
- Figs. 5a ... 5d illustrate by means of the follower arrangement of Fig. 4 installation measures relating to the installation arrangement according to the invention,
- Figs. 6 ... 8 illustrate installation measures relating to the installation arrangement of the embodiment of Fig. 4 as views corresponding to Fig. 1.

In the drawings the reference numeral 1 indicates a lock case of a door lock having a cover which in the figures is shown partly opened. The lock case 1 is provided with a front plate 2 through which a bolt 12 of the lock is movable. In addition the lock case 1 is provided with an operation axis 3 to which is installed a follower 4 which is turnably supported to the lock case and which in the embodiments shown acts on the bolt of the lock through a separate force transmission lever 5. Depending on the lock type, when desired, the follower can naturally be arranged to move the bolt of the lock also directly.

In practice the follower 4 can be affected from both sides of the lock case. A key operated lock mechanism or the like, which is provided with a torsion arm or a corresponding force transmission element (not shown) acting directly on the follower 4, is installed on the operation axis 3 on one side of the lock case in a way known as such. Alternatively, also a handle or the like may be installed a spindle of which acts directly on the follower 4. On the other side of the lock case a handle, a turn knob or the like is installed on the operation axis 3, a spindle of which (cf. figure 2) is independent on the said force transmission element of the lock mechanism or of the spindle of the handle installed on the other side of the lock so that the handle operation in question can correspondingly be controlled independently. The force transmission required by the handle operation is arranged by means of a coupling member 6,6', which has two selectable operating positions, a force transmission coupling position, in which the bolt of the lock can be moved by means of the handle, and a force transmission decoupling position, in which the bolt of the lock correspondingly cannot be affected by means of the handle.

Control of the handle operation occurs with an arrangement, which includes a solenoid 7 which moves a shaft element 9 against the force of a spring 8. Arranged on the shaft element 9 there is a lever member 10 which is turnable around a spindle 11 and by means of which is it possible to select whether or not the coupling member 6,6' is in its position connecting the force transmission.

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The follower arrangement of figure 2 is as follows. The follower 4 is provided with a spindle aperture 4a, which is located in the lock case at the position of the operation axis 3. Since the torsion arm associated with the key operation of the lock or the spindle of a handle to be installed on the corresponding side of the lock extends in practice to the spindle aperture 4a (not shown), it can always be used to directly operate the follower 4. The follower 4 includes additionally a sleeve-like element 4b, to which the coupling member 6

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is turnably journalled. The coupling member 6 includes two protrusions 6a and 6b, which are located on either side of a protrusion 4c arranged in the follower. The protrusion 4c prevents movement of the coupling member 6 in the direction of the operation axis 3.

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On different sides of the follower 4 there are turnably journalled torsion units 13 and 14 including spindle apertures 13a and 14a and counter surfaces 13b and 14b for the protrusions 6a and 6b of the coupling member 6. The whole follower arrangement is turnably journalled to the lock case 1 by means of bearing elements 15. The arrangement includes also an adapting member 16 by means of which the selectivity for the handle operation can be provided so that the spindle 17 of the handle extends to the spindle aperture 13a or alternatively to the spindle aperture 14a but not to the actual spindle aperture 4a of the follower. Hence the force transmission required for the handle operation can be coupled or decoupled under the control of the solenoid 7 on that side of the door in the spindle aperture of which the adapting member 16 is in each case installed (cf. figures 3a and 3b). Since the adapting member 16 is so dimensioned that it can be inserted in the spindle aperture of the torsion units 13 and 14, if necessary it may be removed to be installed on the other side of the lock without opening the lock case 1.

In an alternative embodiment shown in figure 4 the coupling member 6' includes only one protrusion 6'a which is movable in the direction of the axis of the sleeve-like element 4b so that it may optionally be installed on either one side of the protrusion 4c of the follower. In order to arrange for the moving operation the coupling member includes counter surfaces 6'c for a suitable tool, for instance a screwdriver. For other parts the embodiment of figure 4 is analogous with that shown in figures 2, 3a and 3b. Thus, when one wishes to change the solenoid controlled handle operation from one side of the door to the other the coupling member 6' must first be moved so that its protrusion 6'a is positioned on the other side of the protrusion 4c and in

addition the adapting member 16 needs to be moved on the other side of the lock.

Installation measures of the coupling member 6' relating to the embodiment of figure 4 are illustrated with figures 5a...5d and 6...8. In the starting situation of figures 1 and 5a the coupling member 6' with its protrusion 6'a is in contact with the counter surface 13b of the torsion unit 13 affected by the lever member 10, whereby a handle installed on the operation axis 3 (not shown) is in force transmission connection with the follower 4. When the lock case is installed to a door, in case it is discovered that the handle operation in this position of the coupling member 6' would be located on the wrong side of the door, the following installation measures are carried out.

The follower 4 is turned from either one side of the lock case to the opening position of the bolt in accordance with figure 6. As a consequence of this the counter surfaces 6'c in the coupling member are located at the position of an opening 1a in the cover of the lock case 1. The coupling member 6' is turned with a suitable tool through the opening 1a by making use of the counter surfaces 6'c as shown in figures 5b and 7 so that thereafter the coupling member 6' can be further pressed with the tool along the sleeve-like element 4b beyond the protrusion 4c to the position of figure 5c. In this position the coupling member 6' can be further turned by the tool into the position of figures 5d and 8. Thereafter the follower 4 is turned back to the position of figure 1, whereby the coupling member 6' can again be selectively arranged, by means of the solenoid 7, into force transmission connection with the follower 4 through the counter surface 14b of the torsion unit 14. By these measures and by moving also the adapting member 16 from one side of the lock to the other as described above the handle operation can be changed from one side of the lock case to another as required by the installation situation of the lock case.

In accordance with the embodiment of figure 2, thus, both the torsion units 13 and 14 can as such be always guided, under the control of the solenoid arrangement, to be in force transmission connection with the follower by means of the protrusions 6a and 6b of the coupling member 6, whereby the  
5 location of the adapting member 16 determines on which side of the lock the handle operation can be controlled with the solenoid in the way described. In principle one could make use of the embodiment of figure 2 also without the adapting member 16 so that a handle with a spindle shorter than usual is installed on the operation axis 3 so that it normally extends only to the spindle  
10 aperture of the torsion unit but not to the spindle aperture of the follower.

The invention is not limited to the embodiment shown but several modifications are feasible within the scope of the attached claims.

## CLAIMS

1. An installation arrangement for a solenoid controlled handle operation in a door lock in which force transmission from either side of the lock from an operation axis (3) for a handle or the like to a follower (4) acting on a bolt (12) of the lock is arranged by means of a movable coupling member (6,6'), which receives its guidance from a solenoid arrangement, characterised in that the follower (4) is provided with two separate torsion units (13,14) which are installed on the operation axis (3) on different sides of the follower (4) and are turnably supported to it and which can be coupled by means of said coupling member (6,6') to be in force transmission connection with the follower (4).

2. An installation arrangement according to claim 1, characterised in that the arrangement includes an adapting member (16) which is arranged to be installed in a spindle aperture (13a,14a) of either one of the torsion units to thereby prevent a spindle (17) of the handle from directly connecting with the follower (4), so that the spindle (17) of the handle is in force transmission connection with the torsion unit (13,14) in question.

3. An installation arrangement according to claim 1 or 2, characterised in that the coupling member (6) includes two protrusions (6a,6b) which each can be coupled to be in cooperation with a torsion unit (13,14) of its own.

4. An installation arrangement according to claim 1 or 2, characterised in that said coupling member (6') includes a protrusion (6'a) which has a first installation position in which it is in cooperation with a first torsion unit (13) and a second installation position in which it is in cooperation with a second torsion unit (14), and in that the coupling member (6') is movable from the first installation position to the second installation position for changing the handle operation from one side of the door lock to the other.

5. An installation arrangement according to any one of the preceding claims, characterised in that the follower (4) includes a sleeve-like member (4b) for turnably journalling of the coupling member (6,6').

5 6. An installation arrangement according to claim 4, characterised in that the coupling member (6) is arranged to be movable in the direction of the operation axis (3) for affecting said changing of the handle operation.

7. An installation arrangement according to claim 6, characterised in that the  
10 follower (4) includes a guiding member, for instance a protrusion (4c), which normally prevents movement of the coupling member (6') from its first installation position to its second installation position.

8. An installation arrangement according to claim 6 or 7, characterised in  
15 that the coupling member (6') includes counter surfaces (6'c) for an installation tool and in that the casing of the door lock includes an opening (1a) through which the installation tool can be taken to cooperate with said counter surfaces (6'c) for said moving of the coupling member (6').

20 9. An installation arrangement according to any one of the preceding claims, characterised in that the spindle apertures (13a,14a) of the torsion units are so designed that they allow the adapting member (16) to be inserted into its position in the torsion unit and removing away from the torsion unit without demounting the torsion unit.

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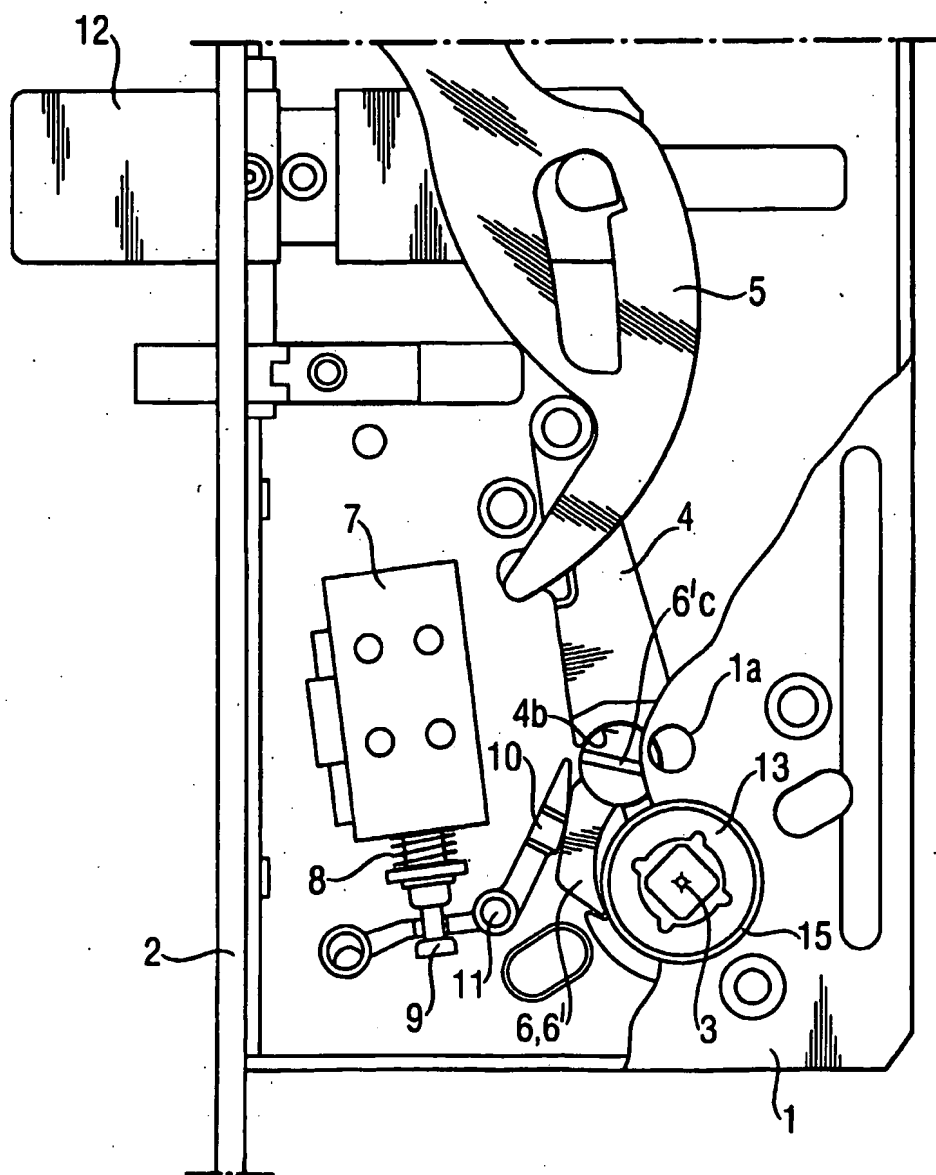
10. A door lock, including a bolt (12), a follower (4) for moving the bolt and an operation axis (3) at either end of which an operation device can be installed for operation of the follower (4), whereby force transmission from either side of the lock to the follower (4) is arranged by means of a movable  
30 coupling member (6,6'), which receives its guidance from a solenoid arrangement or the like, characterised in that the follower (4) is provided with two separate torsion units (13,14) which are installed on the operation axis

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(3) on different sides of the follower (4) and are turnably supported to it and which can be coupled by means of said coupling member (6,6') to be in force transmission connection with the follower (4), in that on said operation axis (3) on one side of the lock and the follower (4) there is arranged to installed  
5 an operation device, for instance a key operated lock mechanism, a handle or the like, which acts directly on the follower (4) through a spindle aperture (4a) located therein, and in that on said operation axis (3) on the other side of the lock and the follower (4) there is arranged to be installed an operation device, for instance a handle or the like, which is arranged in force transmis-  
10 sion connection with the follower (4) through the torsion unit (13,14) and said coupling member (6,6').

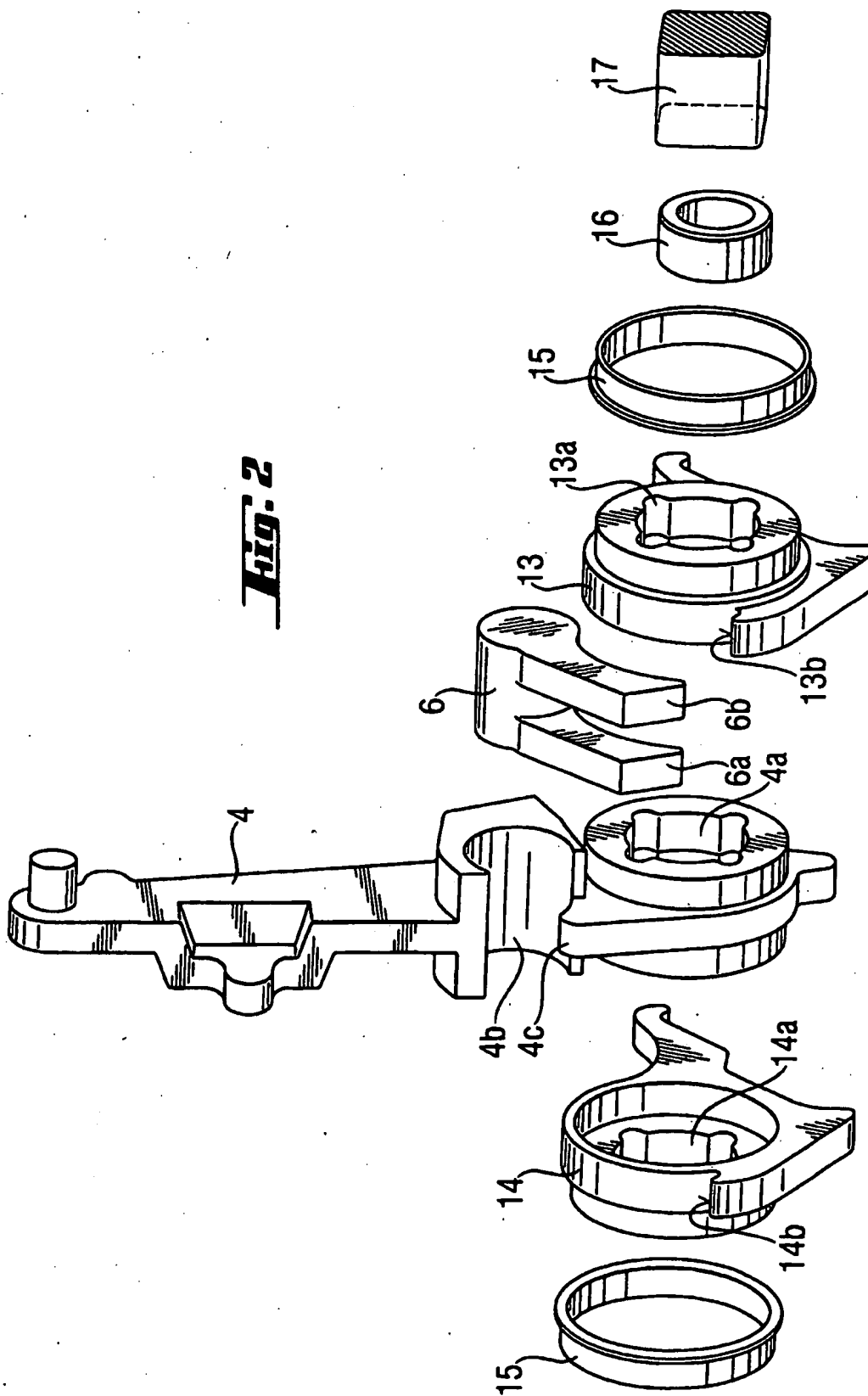
11. A door lock according to claim 10, characterised in that the selection for providing force transmission through the torsion unit (13,14) is arranged by  
15 making use of a separate adapting member (16), which is installed in the spindle aperture (13a,14a) of the selected torsion unit so that it prevents a spindle (17) of the handle from directly connecting with the follower (4).

12. A door lock according to claim 11, characterised in that the coupling  
20 member (6') includes a protrusion (6'a) which is functionally connected with only one torsion unit (13,14) at a time, whereby the selection for providing force transmission through the torsion unit (13,14) is arranged by arranging the said protrusion (6'a) of the coupling member on the desired side of the follower (4).

**Fig. 1**

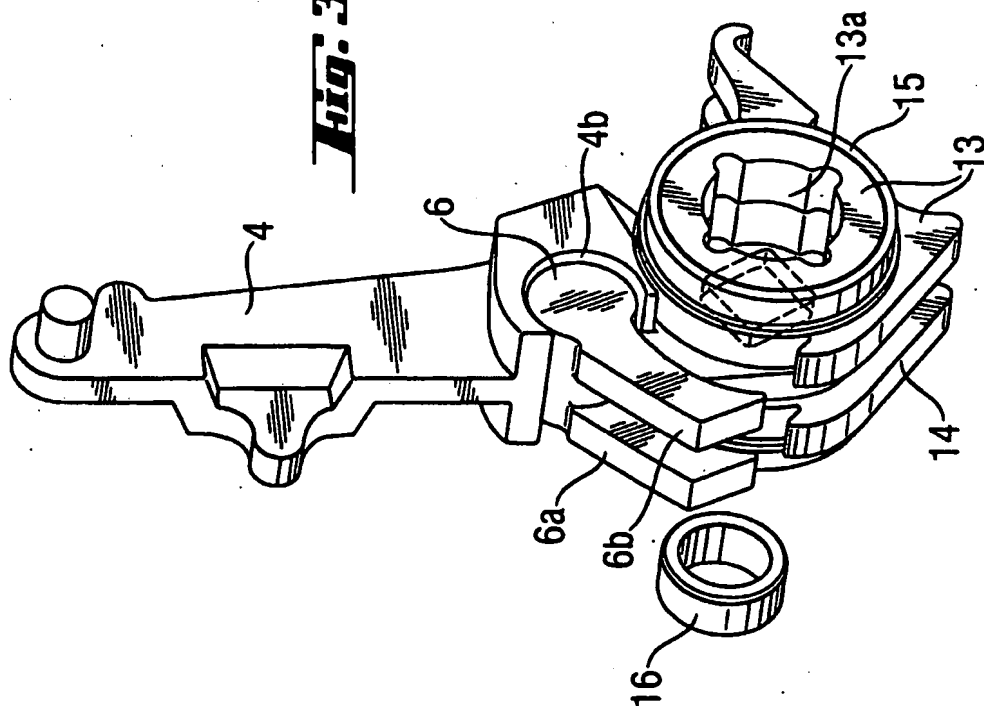
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**Fig. 2**

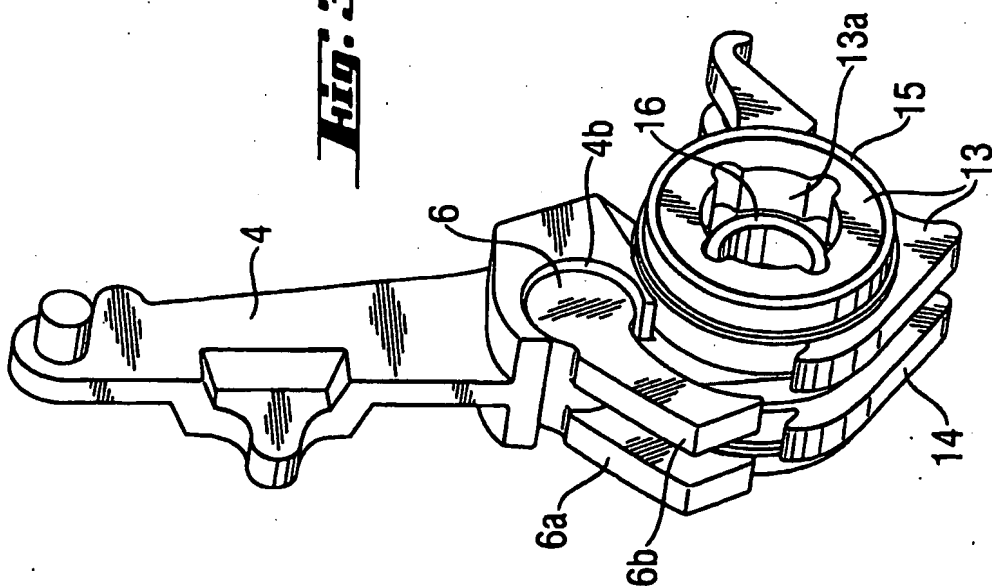




**Fig. 3b**

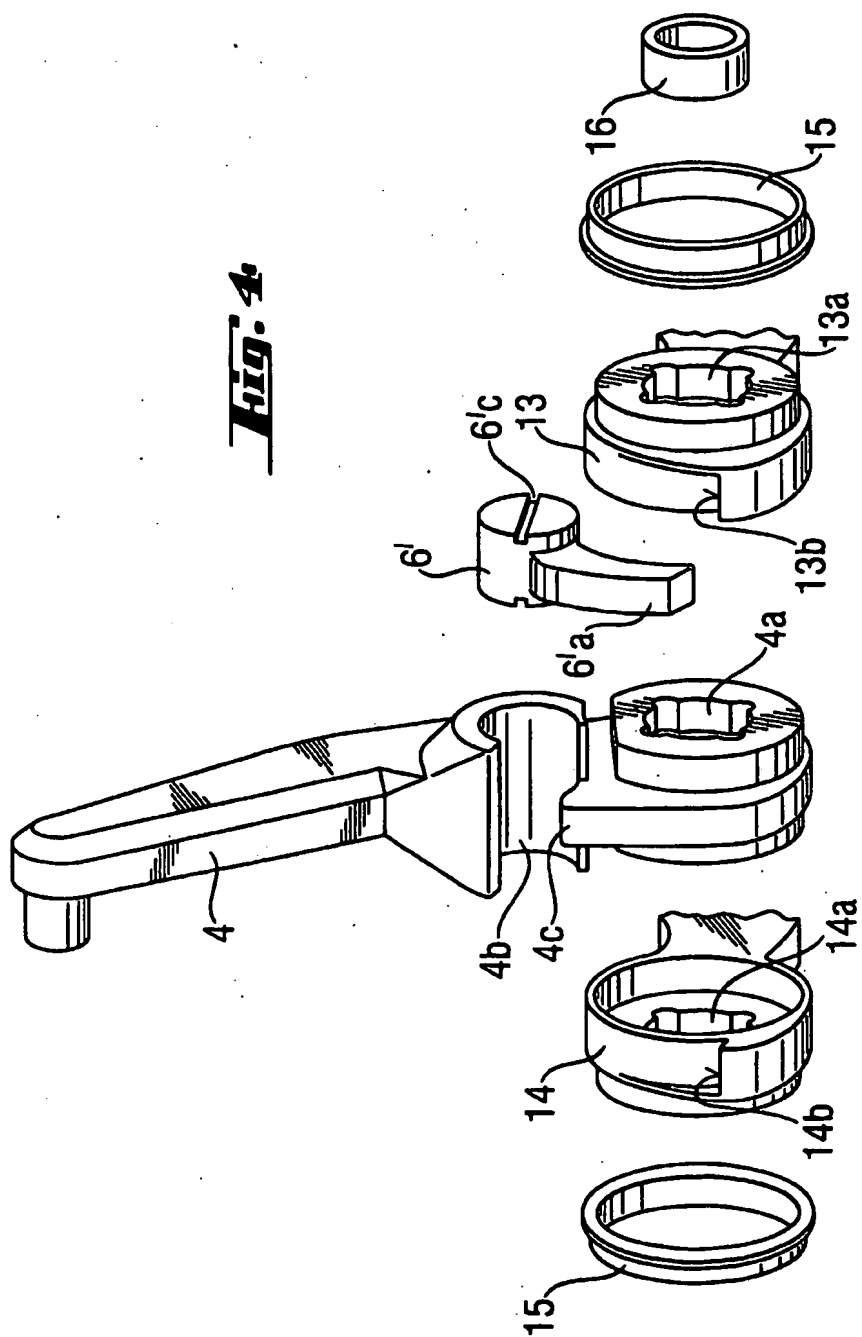


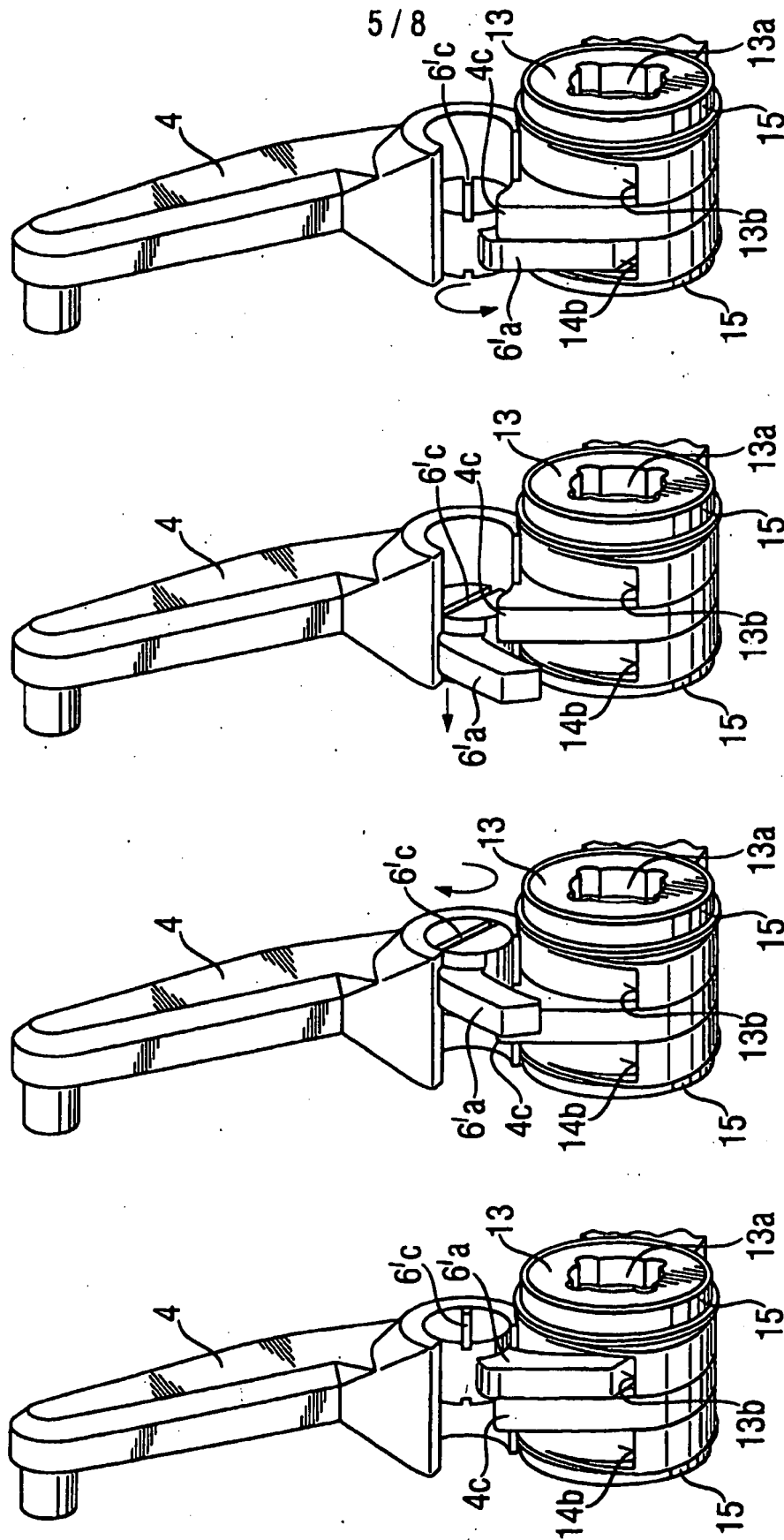
**Fig. 3a**



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**Fig. 4**





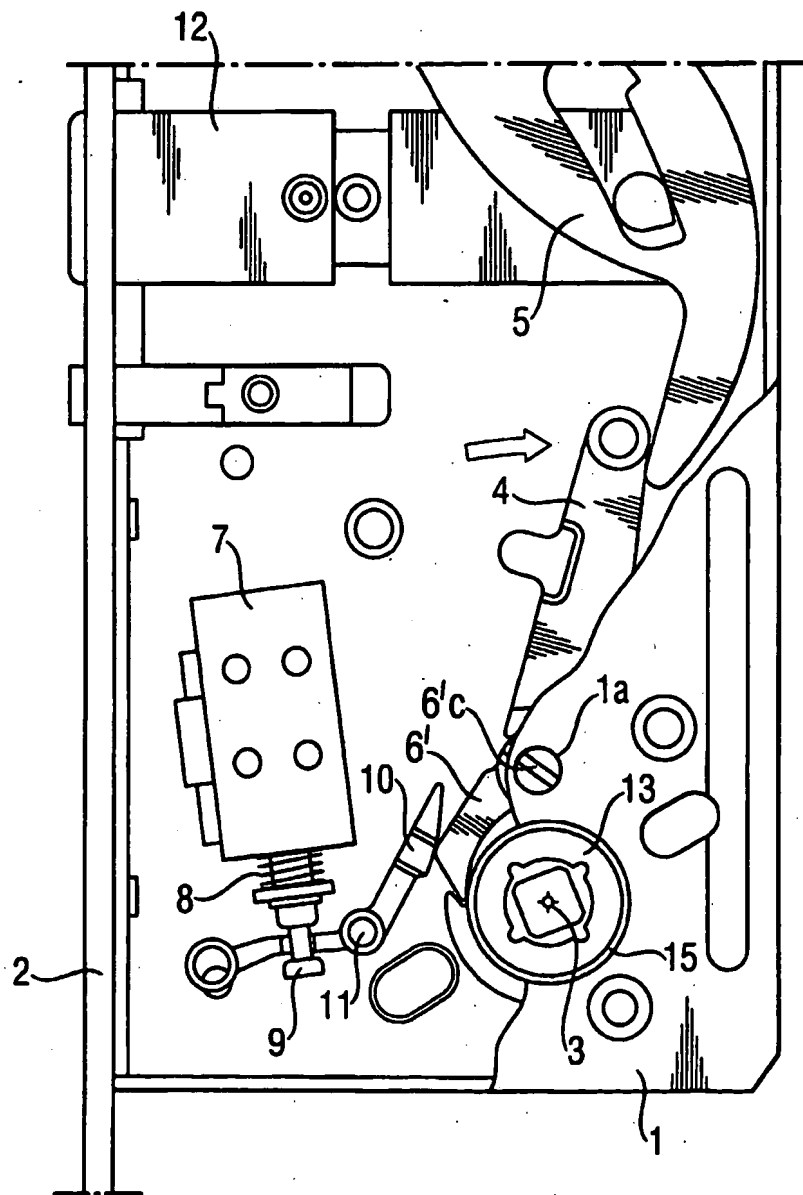
**Fig. 5d**

**Fig. 5c**

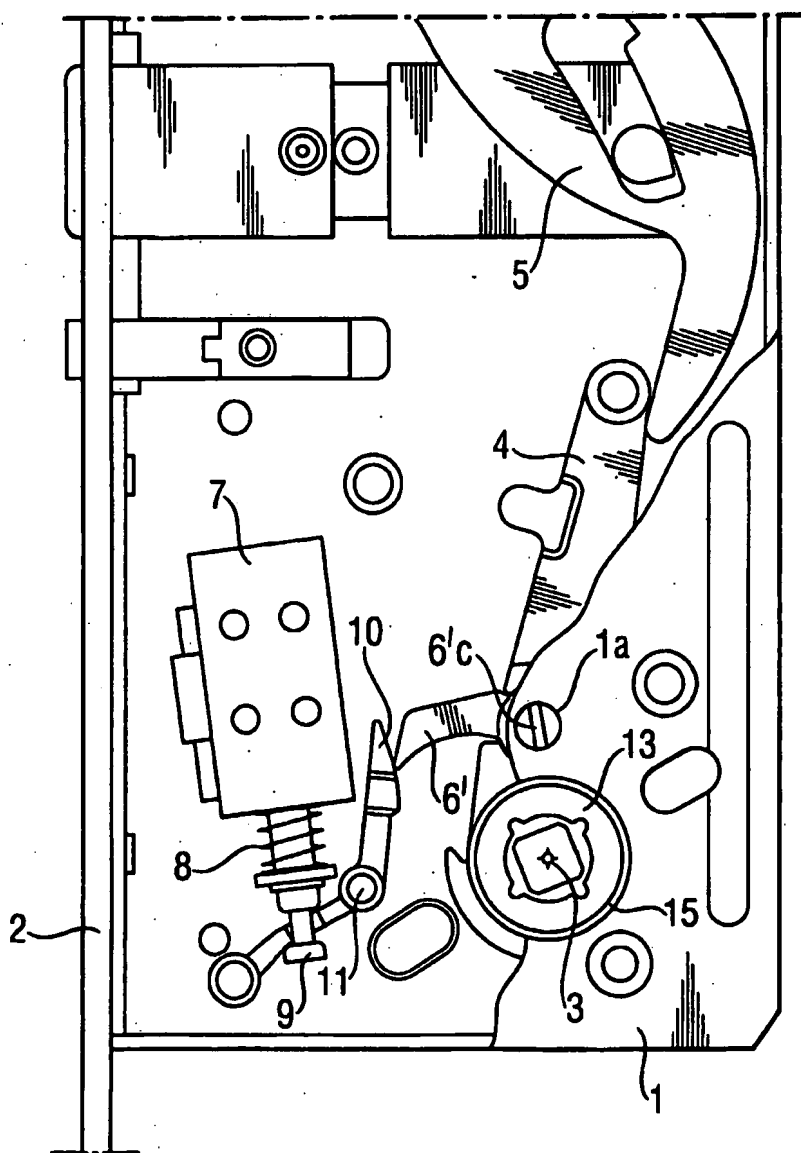
**Fig. 5b**

**Fig. 5a**

**Fig. 6**



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**Fig. 7**



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 02/00036

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E05B 47/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

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IPC7: E05B

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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| Patent document<br>cited in search report |         |    | Publication<br>date | Patent family<br>member(s) |            | Publication<br>date |
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